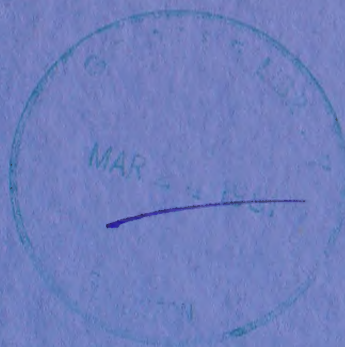


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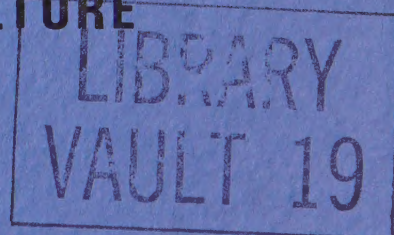
PRELIMINARY REPORT

ON

RECREATION POTENTIAL CROWFOOT CREEK RESERVOIR

PREPARED BY

DEVELOPMENT PLANNING BRANCH
WATER RESOURCES DIVISION
ALBERTA DEPARTMENT OF AGRICULTURE



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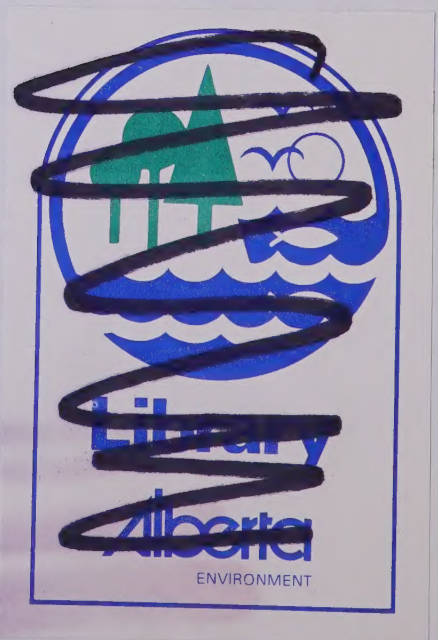
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Erratum

Page 9, line 13 "and Red Deer eleven" should read "and Red Deer twelve"

Page 11, line 1 "and Red Deer five" should read "and Red Deer six"



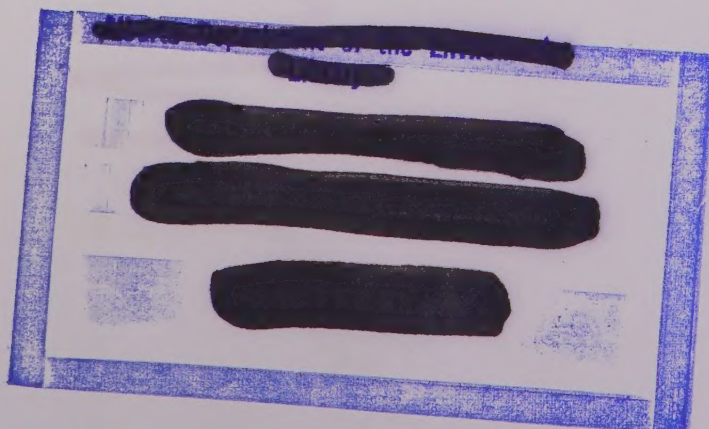
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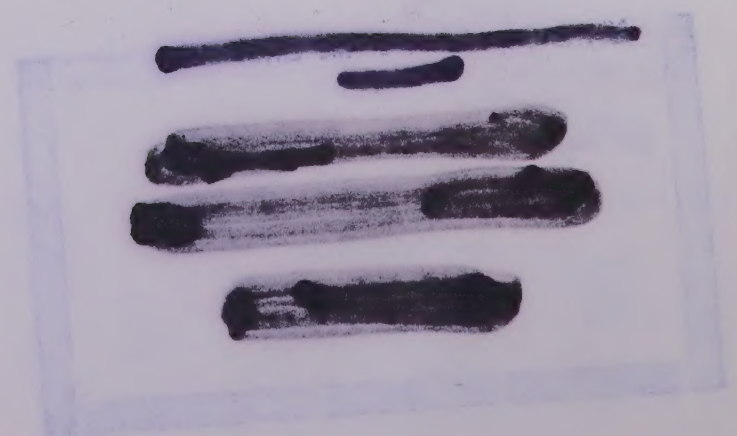
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PRELIMINARY REPORT

GROWTH OF CREEK RESERVOIR RECREATION POTENTIAL

PREPARED BY

DEVELOPMENT PLANNING BRANCH
WATER RESOURCES DIVISION
ALBERTA DEPARTMENT OF AGRICULTURE



SUBMITTED BY
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ACKNOWLEDGEMENTS

This preliminary report was prepared by C. Link, under the supervision of C. L. Primus.

The manuscript was reviewed by J. C. Purnell, T. V. Mussivand and I. H. Anderson.

Introduction	1
Site location and Access	2
Physical Site	2
Water Supply and Quality	3
Water Level Fluctuation	3
Old River Waterfalls	4
The Need for Water Level Regulation	4
Regulation Methods	11
Summary and Conclusions	12

TABLE OF CONTENTS

	<u>Page No.</u>
TABLE OF CONTENTS	iii
LIST OF TABLES	iv
ABSTRACT	v
Introduction	1
Site Location and Access	2
Physical Site	2
Water Supply and Quality	3
Water Level Fluctuation	3
The User Hinterland	4
The Need for Water-Based Recreation	8
Recreation Potential	11
Summary and Conclusions	13

LIST OF TABLES

<u>Table No.</u>		<u>Page No.</u>
1	User Hinterland Population	5
2	Distance of Major Urban Centers from Reservoir Site	6
3	Provincial Parks Attendance	9
4	Alternative Water-Based Recreation Areas	10

ABSTRACT

This report presents a preliminary assessment of the recreation potential of the proposed Crowfoot Creek Reservoir. Access to the reservoir site is good. The terrain in the vicinity of the reservoir is such that recreational development could take place. Reservoir drawdown would result in the exposure of extensive mud flats. The water supplied from the Bow River would be of good quality. The user hinterland was defined as the area within 100 radial miles of the reservoir site. The present population within this area was estimated as being 561,000. There are a number of existing water-based recreation areas which are alternatives to the Crowfoot Reservoir.

The Crowfoot Reservoir would have potential for recreational development but before its full potential could be realized facilities would have to be provided.

RECREATION POTENTIAL OF THE PROPOSED CROWFOOT RESERVOIR

Introduction

Evaluation of the recreation potential of a prospective reservoir poses several problems as the task is primarily one of a subjective nature. The initial problem which sets limitations on an objective evaluation is the fact that the reservoir does not exist. The validity of such an evaluation study is questionable and a concrete analysis is not feasible until a reservoir project is realized. However, despite problems and limitations, an attempt must be made to assess the project's recreation potential, in order to estimate the project's overall value.

Before the full recreational potential of the proposed Crowfoot Reservoir could be realized, complementary facilities would have to be provided. Development would include facilities for recreational activities and improvement of the aesthetic quality of the site. Recreational costs incurred should be considered as part of the total project costs. Development of facilities must take place before recreationists can utilize the full potential of a water-based recreation area.

The recreation potential of the proposed Crowfoot Reservoir was determined by evaluating the characteristics of the reservoir and relating these characteristics to the various factors which influence the potential recreational use of a water-based recreation area. Characteristics of the proposed reservoir which were considered for evaluation include:

- Location of the reservoir site

- Physical geography of the site

Reservoir size

Water level fluctuation.

Factors influencing the potential use of a reservoir which were assessed include:

Accessibility to the site and to the water

The user hinterland or potential zone of use

The need for water-based recreation as related to existing
alternative water-based recreation areas.

Site Location and Access

The proposed reservoir site is located on Crowfoot Creek about fifty miles east of the City of Calgary and eight miles north of the Town of Cluny in Township 23, Ranges 20 and 21, West of the 4th Meridian.

Prime access to the area is via paved Highway No. 1 which comes to within six to eight miles of the reservoir site. Highway No. 1 serves the area from the west and southeast, Highways Nos. 23 and 24 from the south and Highways Nos. 21 and 956 from the north-northeast. There are also a number of county roads which serve various locations on the reservoir site.

Physical Site

The topography of the general area is level and undulating to gently rolling. The immediate reservoir site is very gently sloped with a vertical drop of 25 feet in four miles. Side slopes vary from gentle to steep from the upstream to downstream areas of the site.

The soil is primarily clay loam. There are no trees or brush in

the area and vegetative cover is limited to short prairie grass.

The proposed damsite is located in Sections 9 and 15, Township 23, Range 20, West of the 4th Meridian. At FSL elevation 2800 feet the reservoir would have a surface area of 11,800 acres and a total storage capacity of 300,000 acre-feet. Approximate length of the reservoir would be ten miles and the width about three miles at the widest point. The shoreline would be some fifty miles long. Maximum water depth at the dam would be sixty-five feet.

Water Supply and Quality

Water for the reservoir would be supplied from the Bow River through the Western Irrigation District diversion headworks. The point of diversion is above the points where Calgary's sewage and oil refinery effluents enter the Bow River. Therefore, the water would be of acceptable quality for recreational use.¹

Water Level Fluctuation

Water level fluctuation would occur during the irrigation season (April to September) to supplement water requirements of the Eastern Irrigation District. The maximum fluctuation that would occur if all live storage was used would be fifteen feet. However, using historical flow records and anticipated irrigation demands, reservoir fluctuations have been calculated not to exceed five feet (below FSL) during 90 percent of the time water is released for irrigation. June and July were found to be the months when greatest drawdown occurred. These months, being prime recreation months, are considered most critical when evaluating recreation potential of an irrigation reservoir. A maximum

¹ Personal communication with D. Shewchuk, Environmental Health Division.

drawdown of twelve feet would have occurred only once during the period studied. Even with these moderate fluctuations, fairly extensive mud flats would be exposed during periods of reservoir drawdown. A five foot drawdown would expose a total of 1,800 acres below FSL. The area of land exposed would increase towards the upstream end of the reservoir.

For maximum recreational benefits to be realized, water level fluctuations should be zero. In the case of multipurpose reservoirs a compromise between reservoir users would have to be made in order to receive optimum benefits.

The User Hinterland

The user hinterland is the area surrounding a recreation resource (in this instance water-based recreation) from which recreationists may be attracted. Delineation of the hinterland itself is difficult because of the diversified characteristics of the population from which recreationists may be drawn. However, using existing recreation studies, some insight can be gained into the characteristics of users of water-based recreation areas.

A study by Clawson and Knetsch defines one-way distances that people are willing to travel for day-use and for weekend-use of water-based recreation areas. The travelling distance for a one-day outing was estimated as 20 to 50 miles (farther if traffic is light and attractive areas are unavailable nearer) and for a weekend outing as 100 to 150 miles.¹

¹ M. Clawson and J. L. Knetsch, Economics of Outdoor Recreation The John Hopkins Press, Baltimore, 1966.

Using these parameters, a user hinterland for the Crowfoot Reservoir was delineated by circumscribing the area around the reservoir site. This hinterland has a radius of 100 miles and the population within this area is assumed to be the source of recreationists which may be attracted to Crowfoot. Estimates of the population at 10 mile intervals were obtained using population by township maps (1966 census). Rural and urban populations were included; the major urban centers were the cities of Drumheller, Calgary, Lethbridge and Red Deer.

Table No. 1 shows the accumulative population in relation to radial distance from the reservoir site.

TABLE NO. 1
USER HINTERLAND POPULATION
(1966)

<u>Radial Miles from Site</u>	<u>Accumulative Population</u>
10	1,126
20	5,910
30	11,346
40	23,323
50	39,533
60	391,585
70	409,915
80	432,164
90	504,982
100	561,114

In a public user study of four central Alberta lakes, it was found that the majority of users interviewed came from the larger urban centers. It was also found that nearness to home was the main reason for choosing a particular site over other lakes and that distance was a major factor in deciding whether other lakes would be visited.

Table No. 2 shows the one-way radial distances of major urban centers from the Crowfoot site.

TABLE NO. 2

DISTANCE OF MAJOR URBAN CENTERS FROM RESERVOIR SITE

<u>Urban Center</u>	<u>Radial Distance from Site (Miles)</u>
Drumheller	40
Calgary	60
Lethbridge	90
Red Deer	100

The findings from the study of users of lakes in central Alberta are supported by another study of lakes in north-central Alberta where it was found that the distances people (interviewees) were willing to travel were directly related to the desired recreation activity.

For one day's fishing, more than half of the respondents were willing to travel 100 miles or more; for weekend fishing the distance was 150 miles or more. Three-fourths of the interviewees were willing to travel over 100 miles for weekend camping. For day-use, picnicking and swimming, over seventy percent of the respondents were willing to travel only 25 miles.

¹ Alberta Department of Agriculture, Economics Division.
Recreational Characteristics of Four Central Alberta Lakes. 1968.

² J.J. Nowicki, Recreational Capability and Use of Some North-Central Alberta Lakes. U. of A. 1969.

A study completed by the Water Resources Division showed water-related recreation characteristics and attitudes of residents of the City of Calgary who were questionnaire-surveyed by the Research Division of the Alberta Department of Youth in 1968.¹ Examining the recreational activities engaged in outside the Calgary area, it was found that a large proportion of those surveyed (81 percent) participated in water-related recreational activities. Proportionately, 36 percent of the activities were water-based and 45 percent were water-oriented. Fishing, swimming, and boating were respectively the most popular water-based activities, while camping, picnicking and hunting were the favorite water-oriented activities.

The destination of approximately 20 percent of those surveyed travelling outside the Calgary area was lakes. Since a much higher proportion of the interviewees indicated that they participated in water-related activities, it can be assumed that for recreational purposes persons travel not only to lakes but to other sources of water such as creeks and rivers. The distance survey respondents travelled to lakes was examined to determine whether their travel patterns correspond to those described by Clawson and Knetsch. The average one-way distance travelled outside the Calgary area was found to be 114 miles, while for weekend trips it was 133 miles. Of those respondents travelling to lakes 30 percent visited lakes within 50 miles of Calgary. From this it was assumed that this distance represented day trips, as only 4 percent of the respondents visited lakes within this distance on a weekend trip. It is generally expected that more people would take day trips rather

¹ Water Resources Division, Water-Related Recreation Characteristics And Attitudes of Calgarians, 1970.

than weekend trips, but the survey indicated that 64 percent of the trips outside of Calgary were over 100 miles from the city. From this it was assumed that the low proportion of people travelling within 50 miles of the Calgary area is an indication of the small number of lakes within this distance. It was therefore anticipated that if more lakes were available within a 50 mile radius of Calgary, the number of users would increase.

The findings of the aforementioned studies give some indication as to the areas from which potential recreationists can be expected to come from, namely, urban centers. Also, the distance which people are assumed to be willing to travel for day-use and weekend-use of a recreation resource can be applied to the proposed Crowfoot reservoir. Indication was also given as to what activities recreationists prefer or desire.

The Need for Water-Based Recreation

Interest in water-based, outdoor recreation is evidenced by the increasing attendance at Alberta's provincial parks and campsites. Table No. 3 shows attendance figures for a few water-based recreation parks in Alberta and the increase in attendance over the period 1959 to 1969.

TABLE NO. 3
PROVINCIAL PARKS ATTENTANCE

<u>Park</u>	<u>1959</u>	<u>1969</u>	<u>% Increase</u>
Aspen Beach	130,400	476,736	265
Miquelon Lake	8,950	458,475	5,023
Wabamun Lake	29,212	332,992	1,039
Little Bow*	7,400	68,008	819
Kinbrook Island*	12,900	114,616	788
Park Lake*	93,800	280,184	199

* Irrigation Reservoir

Source: "Within Our Borders", May 1970, a Government of Alberta Publication.

Using the cities of Calgary, Lethbridge, Drumheller and Red Deer, as assumed generator points for recreationists, a number of existing water-based recreation areas which can be considered alternatives to the Crowfoot site have been tabulated. Recreation areas offering similar activities, and their approximate distances from the previously mentioned cities are shown in Table No. 4. The Crowfoot site has been shown with its relative distances from the cities for purposes of comparison. It is assumed that the Crowfoot Reservoir would have to offer a comparable quality and variety of recreation as exists at alternatives which are the same distance as or closer than the Crowfoot site is from the cities:

Calgary has three existing alternative water-based recreation areas within the same distance as the Crowfoot site; Lethbridge has seven, Drumheller one and Red Deer eleven. Assuming a one-way distance of 50 miles for a day-outing, Calgary has one alternative, Lethbridge two, Drumheller

TABLE NO. 4

ALTERNATIVE WATER-BASED RECREATION AREAS

(Approximate distance in radial miles from center of city)

	<u>Calgary</u>	<u>Lethbridge</u>	<u>Drumheller</u>	<u>Red Deer</u>
Crowfoot Reservoir	60	85	35	100
Beauvais Lake	110	60	150	190
Buffalo Lake	110	190	70	40
Chain Lakes	55	70	100	135
Chestermere Lake	10	105	55	80
Cooking Lake	160	250	130	85
Crimson Lake	110	210	125	50
Elkwater Lake	140	115	160	230
Gooseberry Lake	160	190	95	130
Gull Lake	100	190	95	30
Kinbrook Island	90	65	75	150
Lac Ste Anne	180	280	155	100
Little Bow Park	75	40	85	140
Little Fish Lake	80	120	20	90
McGregor Lake	60	60	60	115
Miquelon Lake	160	250	120	80
Park Lake	100	10	110	170
Pigeon Lake	140	230	120	50
Pine Lake	80	160	55	20
Sylvan Lake	90	190	85	15
Wabamun Lake	170	270	150	90
Waterton Lakes	140	60	160	245

one and Red Deer five. Using 150 miles as the maximum one-way distance for a weekend outing, Calgary has (including those alternatives within 50 miles) sixteen alternatives, Lethbridge ten, Drumheller eighteen and Red Deer seventeen.

Recreation Potential

The recreation potential of the prospective reservoir was evaluated by assessing the physical characteristics of the proposed shoreland and water resource, and relating these characteristics to their capability to engender recreational use. As a result of the evaluation it was assumed that before the reservoir's full potential could be realized and its benefits claimed, recreational development would have to take place.

The relativity of the shoreland to the water resource is one of mutual dependency. Generally, the shoreland would have to be suitable for activities secondary and associated to water-based activities before these activities will materialize. Activities such as boating, water skiing, fishing and swimming, require access to the water from the shore. For example, if boating is to take place, boat launching facilities as well as mooring and beaching areas must be provided. Activities which are secondary and shore-based, but associated with water-based activities are viewing, sunbathing, picnicking and camping.

The Shoreland: Aesthetically, the shoreland would be of questionable quality. Vegetative cover is limited to cacti and grass, but planting of trees may improve the area to some degree. Reservoir water level fluctuation would result in exposure of unsightly mud flats which in turn make access to the water unpleasant and difficult. Also the provision and maintenance of permanent beaches could prove to be costly and

impracticable. The backshore, being relatively flat, could lend itself to development. Here again, the aesthetic quality would probably require improvement. Access to the shoreland area would be good, as a number of county roads exist connecting major highways to the reservoir site. The fluctuating water level would probably be the major deterrent for secondary, shore based activities.

The Water Resource: The reservoir itself could have the capability to engender water-based activities. The surface area (11,800 acres at FSL) would be large enough to accommodate all types of water activities. Water quality of the reservoir would be acceptable for water sports and could sustain fish life all year. Most fishing would probably take place from boats because of the unpleasant aspects of fishing from a muddy shore. However, many fishermen could be attracted to the dam which has a crest length of 2850 feet and could accommodate a number of fishermen. Boating and water-skiing would not be affected by the fluctuating water levels except for the need to provide adequate boat launching facilities. The water, depending on temperature and access, would be compatible with swimming. The reservoir may have good potential for waterfowl nesting and staging.¹

Crowfoot reservoir would have to offer a comparable or better quality and variety of recreational experiences than those offered at existing alternative water-based recreation sites, in order to sustain intensive use.

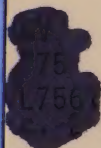
¹ Personal communication with C. Lacy, Ducks Unlimited.

Summary and Conclusions

1. From examination of studies completed on the characteristics of users of several Alberta lakes and the recreation characteristics of Calgarians, it is assumed that the majority of reservoir users would come from larger urban centers.
2. The population within 50 radial miles of the reservoir site is estimated to be 39,500 and within 100 radial miles 561,100.
3. The zone of influence for day-use is assumed to be up to 50 radial miles; farther if more attractive areas are unavailable nearer. One hundred to 150 radial miles is assumed to be the maximum one-way distance weekend users are willing to travel.
4. A study of the recreation characteristics of Calgarians indicated that:
Thirty-six percent of those interviewed participated in water-based activities.
The average one-way distance travelled outside the Calgary area was 114 miles.
The low percentage of people who visited lakes within 50 miles of Calgary was assumed to reflect the small number of lakes within 50 miles of Calgary.
5. A more comprehensive study of the recreation potential of the proposed reservoir would require a detailed field inspection and an investigation of the recreational use of existing irrigation reservoirs in southern Alberta and the effect fluctuating water levels have on their use.

6. Before the recreation potential of the reservoir can be substantiated recreational development complementary to the reservoir would have to take place.
7. Recreation development costs should be included in the total project costs.
8. The water resource of the reservoir would be of a quality compatible with all water-based activities.
9. Aesthetically the shoreland would have to be improved, this could be partially accomplished by planting trees.
10. Reservoir fluctuations should be minimized.





Link, C.

Recreation potential, Crowfoot
Creek Reservoir.

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